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The 21st International Symposium on
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Richard E. Snow

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EXECUTIVE SUMMARY

The 21st International Applied Military Psychology Symposium was held from 17 through 21 June 1985, hosted in Paris by the French Armed Forces. It enjoyed the largest attendance by countries since the symposium series began in 1963.

Presentations were organized under six headings: selection and utilization of personnel; basic measurement problems; personal and social aspects of military training and performance; coping with stress, panic, and collective behavior; recruitment and retention; and special research topics for the future.

Canada has developed an assessment center approach to officer selection, including both selection and orientation components. Validity data are encouraging.

Denmark's Psychological Division has been developing a new psychology of organizations, including revitalization of selection research and studies of corporate culture and discipline integration. Prediction studies of officer career acceleration potential have been successful. A new procedure called "dynamic strategy testing" allowing observation of open-ended problem-solving appears useful in this work.

Austria is computerizing performance tests for basic selection and classification. Also under development are ergopsychometric tests that compare performance under stress with neutral performance, and include EEG recordings of brain readiness to learn.

Australia emphasizes negative selection with screening tests on minimum standards. Computerized testing, now under development, will be used only for job classification.

British Navy research on trainability tests for antisubmarine-warfare helicopter observers suggests a useful measure of inability to think in the air. Validity is promising.

Belgium is conducting experiments in personality and group dynamics assessment. The focus is on interaction of test conditions and personality differences and on cognition-personality intersections. Computerized adaptive tests are being implemented.

West German work on computerized adaptive testing is advancing rapidly. A prototype system will be evaluated by 1986.

Spanish research on foreign language learning suggests good predictor tests for some languages, not others. Arabic learning involves distinctly different abilities. Ability-learning relations vary substantially across months of training.

Danish women are now serving, in all three branches of its forces, in several kinds of combat roles. Studies are under way; no negative effects in crew readiness have been noted, except perhaps in gunnery.

US research in model-based measurement is advancing to include response pattern and distractor models. Diagnostic models are also a priority.

West German research on aptitude scales with curvilinear characteristics may yield improved differentiation in the middle ranges. This is critical for classification decisions.

Spain has begun social skills training for officers. A study of public speaking skills suggests training effectiveness but also need for revision of training and assessment instruments.

Italian research has compared two generations of Naval Academy applicants to reach a personality profile of current groups. It is clear that no one "type" of person applies, and that the image of the military has improved in recent years.

Portuguese research on organizational socialization in the Naval Academy suggest that Navy culture promotes more of a content-innovative role, rather than a status-quo role, for officers. Socialization indicators are useful in examining value development in the military.

Israel has successfully redefined the role of umpires in military exercises as active participant-observers giving feedback and selecting further training objectives. Unit psychologists also participate in the new kind of exercise to provide follow-up in regular operations.

Israel has also successfully created advanced training for senior officers in behavioral sciences related to management skills. The program is being extended, and will include unit psychologists, again to provide follow-up in regular operations.

Norway is using a theory and assessment of situational leadership. The aim is to adapt leadership styles to varying characteristics of situations and subordinate groups.

France has developed clinical measurement and data systems to track personal-social pathologies in the 18-year-old population. Special groups of discharges and drug abusers are also tracked.

French research has also developed a vivid portrayal of the kinds of stress, panic, and inadaptive collective behavior to be expected in modern warfare. Variables that act to increase adaptive behavior are thus identified.

Sweden has further developed an assessment of cognitive appraisal under stressful conditions that was begun in Israel. Studies of parachute jumping, army squad effectiveness, and civilian and military reaction to submarine threats, show its validity.

French research on sleep deprivation in sustained military exercises has indicated negative effects on divisional headquarters' performance. Recommendations for providing for adequate sleep are given.

Dutch experience with violent demonstrations suggests the need for training of guard personnel in stress and discipline management in such situations. Police training is also indicated, though controversial.

The Netherlands has also now assigned psychologists to specialized roles as confidants and counsellors in fighter squadrons. Stress factors and person-machine interaction are a special focus.

Turkey has developed retrospective methods for investigating military suicides that also have preventive effects. The aim is to use suicidal behavior as an index of group morale.

Canada is experiencing high voluntary attrition as technical training stages are reached. Several programs to combat this are being considered.

Dutch research indicates that attitudes toward Navy careers have changed, though factors involved in joining and leaving remain similar. Job satisfaction is a dynamic process, requiring continuous assessment rather than one-shot studies.

British Army work also uses a continuous survey system to track changes in job satisfaction that influence turnover. To predict individual retirements, however, changes in the conventional measures are required.

Future US research and development will emphasize the understanding of job productivity in organizational contexts and the use of individual differences in person-job interaction. Understanding of cognitive processes in complex problem solving and decision making, and the human-computer complementarity, will also be high priority.

THE 21ST INTERNATIONAL SYMPOSIUM ON APPLIED MILITARY PSYCHOLOGY

1 INTRODUCTION

The 21st International Applied Military Psychology Symposium (IAMPS) was held from 17 through 21 June 1985 in Paris, France. It was hosted by Médecin en Chef des Services Jacques Bremond of the Centre de Recherches du Service de Santé des Armées. The welcoming address on behalf of the French Armed Forces was given by Médecin Chef des Services Henane.

IAMPS this year exceeded last year's meeting in attendance by countries; last year had been the best attended symposium since the series began in 1963. The formal sessions were held in the Cité de l'Air in Paris. There were many useful papers and discussions, and also many informal opportunities for exchange of information among participants from different countries.

The present report provides only a brief summary of the formal presentations. The appendix gives a complete list of participants and their addresses; readers desiring detailed information on particular points should contact individual participants directly. For this report, the presentations are organized under topic headings that do not necessarily reflect the order in which presentations were given at the symposium. The main topics were: selection and utilization of personnel; basic measurement problems; personal and social aspects of military training and performance; coping with stress, panic, and collective behavior; recruitment and retention; and special research topics for the future.

2 SELECTION AND UTILIZATION OF PERSONNEL

M. Rodgers (Canada) began with a discussion of the assessment center approach to officer selection in the Canadian Armed Forces. The approach was developed and refined through the late 1970s and early 1980s by both the Combat

Arms and Naval Officer Selection Boards. There are both selection testing and orientation components, aimed at developing realistic expectations about officer life and at reducing the previously high withdrawal rates. The selection measures include: a leadership task, in which applicants are observed and rated on such dimensions as communication skills and giving directions while leading a small group over an obstacle; assessment ratings of each applicant by the conducting officer, who oversees all initial activities of the applicant--the ratings focus on interest, enthusiasm, and general suitability; a structured interview board, which also focuses on motivation and general suitability but without information from other aspects of the assessment; a file review by the interview board of test and biographical data; an in-basket exercise involving nonmilitary action items and practical problem solving; and two leaderless group discussion exercises, one to examine the characteristics of officership and one on effectiveness in judging and discussing subordinate promotions--observer ratings here focus on persuasion and maintenance of aim in the discussions. Various experimental measures are also included in the battery but excluded from the evaluation. At present these include peer ratings, a mental workload test requiring simultaneous performance on embedded figures and mental arithmetic tasks, Fiedler's contingency scales for applicant rating of their most and least preferred coworkers, pre and post expectation questionnaires, and a measure of information gain and motivational impact designed to evaluate the orientation part of the center program. This orientation component consists of several officer and classification briefings, physical training and sports, movies and tours, and accommodation and meals in settings like those an officer would experience on duty (e.g., naval officer applicants live in a decommissioned destroyer).

Based on 1982 results, all assessment measures appear to be sufficiently reliable and independent from

one another to justify their continued use. Validity data are also encouraging. Using criteria from later stages of training, it appears that the main assessment measures offer useful prediction. The experimental measures, on the other hand, did not provide additional useful information. Further validation studies are under way. Attention is now also directed to questions about incremental validity of the individual assessment exercises over the basic recruit measures, the possible decentralization of some measures for use at earlier stages of recruitment, generalizability of measures across different officer classifications, and the evaluation of the orientation components.

N. Busch-Jensen (Denmark) provided a brief review of the history of the Danish Armed Forces Psychological Division as a context for discussing recent new initiatives in both basic and advanced officer selection and utilization. The Psychological Division began in 1952, concentrating in its first decade on the development and implementation of basic personnel selection testing. In its second decade, attention moved from individual to group psychology, with studies of the role of soldier spokesmen, and surveys of feedback systems, motivation and morale, and the development of leadership training programs. The 1970s saw the institutionalization and refinement of the group-oriented work of the previous years--the focus was on establishing leadership and pedagogical principles for the Armed Forces. Since 1980, the Psychological Division has been part of the Danish Defence Center for Leadership and concentrating on the development of a psychology of organizations. The work concerns revitalization of selection research and studies of corporate culture, organizational development, and discipline integration. But its current tasks span the full range of psychological services to the military. Testing and selection work is done on conscripts, regulars, and officers but also with many categories of specialized personnel, such as pilots, air traffic con-

trollers, arctic personnel, interrogation officers, attack divers, and civilian managers. The psychologists also teach psychology at the military academies and staff colleges, provide psychological first-aid to pilots after accidents, conduct annual leadership conferences for the Chief of Defence, run feedback surveys for battalian commanders and surveys of civilian attitudes, conduct specialized job analyses, and investigate general issues such as pre-pension retirement and the impact of national service on the lives of conscripts.

Initial officer candidates are assessed before entering the academy, but they will have already spent over a year in basic training, corporal's training, and operational duty as a corporal. The dropout rate is below 10 percent here. Therefore, assessment aims at predicting career progression and suitability to the principles of Danish military leadership. The main part of the assessment is done by psychologists, and this is kept strictly separate from the selection officers assessments. The assessment includes paper-and-pencil tests and inventories but emphasizes the results of group exercises and intensive interviews given during a 2-day residential period. An idiographic-clinical approach is used. Current evidence suggests that eventual promotion to lieutenant colonel can be predicted from either academy training exams or from the psychological assessment. But the two are complementary although correlated; even an officer graduating in the top quarter of an academy class will not have a promotion probability higher than average if given low marks in the psychological assessment.

Since 1982 a new design for advanced officer training has allowed various new kinds of career progressions, so the Psychological Division is now asked to conduct assessments of career acceleration potential at various levels beyond basic officer entry level. A major study is under way of a large group of warrant officers who are now eligible for advanced staff college

training. The assessment here is based on a career interview by a psychologist with an officer background, a personality interview by a clinical psychologist, and a new procedure called "dynamic strategy testing". This latter instrument is based on concept attainment and planning tasks--relatively open-ended problem situations in which problem solving approaches, strategies for searching and processing information, levels of abstraction, and frame dependence/independence can be observed.

The advanced officer assessment procedure concludes with a joint discussion among the three psychologists who have independently administered the three parts; the group must reach a consensus judgment on each candidate. The procedure is considered a great success by senior officers and the psychologists who administer it. Dropouts from advanced training programs have been nil. The Division has now been asked to perform similar assessments for civilian applicants for Armed Forces positions equivalent to lieutenant colonel and above, as well as for all basic officers who apply for advanced training henceforth. In the meantime, of course, solid validity data are not yet in hand. But it does appear that the approach brings the Psychological Division further away from a narrow selection view and toward a broader view of the dynamics of different kinds of career development in different organizational contexts in the military.

E. Frise (Austria) then contributed a perspective on the psychological testing system in the Austrian Armed Forces. There are several different selection and classification testing functions aimed in turn at: basic inductee testing at the six induction centers around the country; noncommissioned officer selection; officer selection; military pilot selection; United Nations (UN) soldier selection; and special problems involving selection of communications, anti-aircraft, and other specialists.

In the induction centers, where about 80,000 inductees are tested per year, there are both medical and psy-

chological examinations to check general fitness and assist in job classification. The tests assess intellectual abilities and profiles, and unusual personal dispositions that require further exploration. A board that includes a physician, a psychologist, and a lawyer judges general aptitude level based on individual scores and other data. Under development now is a computerized system that will also test responsiveness and sensorimotor coordination, anticipation of movements, long-term alertness, ability to perform simultaneous activities, and performance under stress. The aim is to install the system in all induction centers and to build a comprehensive data file available throughout each soldier's national service career, so that later selection testing--e.g., for NCO or officer--can be reduced.

Officer selection in Austria was described in last year's IAMPS report (Office of Naval Research, London, conference report C-9-84) and need not be repeated here. There has been a new development for NCO selection, however. This applies new research findings in ergopsychometry based on work at the University of Vienna. Ability and personality measures are administered under neutral conditions and also under stress conditions. The evidence shows that some individuals perform better under stress conditions, whereas others perform worse, than in neutral or conventional conditions. Stresses applied include psychological factors such as disturbing noise, time pressure, distractions, frustrations, and peer pressure, and also physical factors such as heavy physical exercise during testing, bodily inconveniences due to equipment (e.g., wearing helmet and gas mask), and forced marches at night. Validation studies are currently under way.

Selection batteries for military pilots also include ergopsychometric measures and a "brain-triggered design" in which EEG recordings of brain activity are monitored so that computerized tasks are administered at specified moments. The theory guiding this work suggests that EEG patterns show variations

in brain-readiness to learn. The research continues in collaboration with the Institute of Psychology, University of Vienna.

UN soldier selection is another interesting topic. Here the problem is to detect the sorts of characteristics that would predispose deviant or inadequate performance under conditions of long isolation, as typically experienced at the Golan Heights duty station, where observation missions must be precisely conducted even though extremely monotonous. The selection system here is conventional and inadequate, but there are plans to develop simulation tests including sociometric measures in the near future.

P. Drake-Brockman (Australia) reviewed selection and classification in the Australian Army, which is an all-volunteer force typically faced with recruit shortages. About half of the 45 members of the Army Psychology Corps have testing and interviewing as their primary function. The system is one of negative selection; it aims primarily at screening out those who cannot meet minimum standards. Testing is conducted in regional centers in each state and aims at identifying minimal levels of literacy in English, mathematical ability, and general intellectual ability for training purposes. A self-description inventory covers psychosocial and psychomedical behavioral problems. Recruits passing the initial screening are then given medical examinations and a psychological interview. Here the interviewer looks for evidence of lack of suitability or adjustability to army life, or lack of motivation, using cues from the self-description inventory responses.

The Corps has conducted studies on biographical data collection in a structured interview format and also on actuarial versus clinical decision-making in selection. Also, a computerized adaptive testing system is under development now, though its use will more likely be in classification testing; it will not replace the screening tests. At present, classification testing is all paper-and-

pencil, conducted during the basic training course. Emphasis is on intellectual, clerical, and mechanical aptitudes. This information, together with performance on training objectives, biographical data, and the preferences of the recruit, is used to make a list of available jobs for which the recruit is suited. An interview helps fit realistic preferences to available jobs as recruits make their choices, and has reduced eventual job dissatisfaction substantially.

J. Hodgkiss (UK) reported on British Navy research on trainability tests, designed to represent training samples or miniatures followed by evaluations, and to predict chances of passing actual training. They are training samples, not work samples; no previous experience with the work is needed. Trainability tests are seen to be useful where training is an important part of the induction procedure, training wastage rates are high, trainees are often unable to reach acceptable standards in reasonable time, or training involves crucial components taught late in training on which otherwise successful candidates may likely fail. This last use was in fact the first UK military use of such tests--in World War II, Royal Air Force pilot candidates were given 12 hours standardized flying instruction, assessed by experienced pilots, before being selected for regular training.

There have been several recent studies, in Canada, Germany, the UK, and the US, that suggest the potential values of trainability testing. One US Navy study, for example, developed a range of trainability tests, from inspection sorting to conceptual integration and application tasks, and showed these to give predictions of supervisory ratings on the job that were superior to those provided by conventional aptitude tests. One UK application is in selection of antisubmarine-warfare helicopter observers. These are officers who want to be pilots but do not pass the pilot cutoff; they are allocated to the observer position and given 15 months of special training. About 20 percent fail.

The high training failure rate seemed due in part to "inability to think in the air," so an airborne trainability test seemed worth pursuing. Based on critical incident interviews, a training assessment exercise and behavior error checklist was developed. It is administered after 12 hours of ground training in navigation, radar, and instruments and also a ground run of a two-legged navigation route. Then in a 1½ hour flight, the candidate performs radar homings while navigating the given route. Both instructors and pilots participate in the assessment, based on the behavior checklist. In trial studies so far the test seems to offer improved prediction over the conventional system, and this finding cross validates. The research is continuing at present.

Bohrer (Belgium) reviewed his unit's place in the organizational structure of the Belgian Armed Forces and its work over the past year, emphasizing selection research on personality assessment and group dynamics. Of particular interest are new studies of the free response method of personality assessment using scaled adjectives chosen by respondents to describe themselves. Previous results indicate the validity of this approach and also its positive effect on the validity of conventional inventories when it precedes them in administration order. New experiments on this effect are under way. The research also is examining the interaction of test conditions and test anxiety on performance and the relations between cognitive and personality characteristics.

A group situational performance test is also under development. It was described in detail in last year's IAMPS report (C-9-84). Other activities include the computerization of several fluid ability and inductive reasoning tests, comparisons of pyramidal and classical test theory models, and implementation of computerized adaptive testing (CAT) in the Belgian military. There has also been recent work on the construction of achievement tests for NCOs, and on microteaching training of interviewers.

H-J. Shenrett (West Germany) reported on the development of CAT in the German Federal Armed Forces. In 1982, a pilot project began, with the eventual aim of replacing the conventional aptitude classification battery with an automated system of applicant-tailored testing based on microcomputer technology. Three phases were planned.

First, conventional tests were administered by computer to begin studying the range of technical and human factors issues that would eventually need to be addressed. Comparisons between conventional and computer administration could then be undertaken. Some of these studies are now being done using volunteers who had taken the paper-and-pencil version about 10 months earlier. Retest by computer is being compared with conventional retest. Retests, of course, show average improvements in scores, but the computer may also have motivational or curiosity effects. Correlations between conventional and computerized tests are high but not perfect. Further studies examine various moderating effects of computerized testing in more detail.

A second phase introduced adaptive testing using a fixed-branch, pyramidal structure. Here the data so far in hand suggest slightly lower correlations between conventional and CAT scores, relative to conventional and computerized conventional correlations. The third phase will move to CAT based on the variable branching allowed by item response theory models. Empirical work in the first two phases is still continuing, however.

CAT testing stations have been established at the Munich and Hannover recruiting centers. Six subtests of the aptitude classification battery have been computerized, and four others involving apparatus are now being converted to CAT form. The aim is to evaluate a prototype system presumably by 1986. The benefits of CAT are expected to be seen in five respects: savings in testing time due to the automation and precision of many routine testing functions; reduction of problems of test security due to the individually tailored testing

without handouts; reduction in clerical errors; dramatic reduction in the logistics of testing; opportunities to develop new measures of abilities in dynamic tasks with reaction times as well as errors contributing to scores; and new combinations of training and testing in combined instruments.

J. Puente Ontanilla (Spain) described Spanish research on foreign language learning and some exploratory selection tests that might be used to identify students for German, Russian, and Arabic study programs. The predictors used are tests of grammatical performance and knowledge of Spanish syntax, logical reasoning, verbal comprehension, sensitivity to grammatical frames and functions of words in sentences, and associative memory. Criteria were academic scores by month through a 15-month program.

Logical and verbal reasoning measures offer reasonably good prediction; the evolution over months of the ability-learning relation shows gradual increase in prediction and then some decline to a constant plateau for German and Russian learning. Words in sentences is the single best predictor test. However, the Arabic course shows different mean and correlation curves; average performance rises, declines, and then continues to rise over months. Ability differences disappear in time; verbal ability scores do not predict and even show some negative correlations. Negative relations are also given by associative memory scores, especially later in training. It is possible that Arabic represents a particularly different visual-perceptual task where performance may be negatively related to verbal and associative abilities.

Schlüter (Denmark) reviewed the situation of women serving in the Danish Armed Forces. The Army and Air Force have employed women since the early 1970s though service was routinely restricted to noncombat roles in the administration, supply, communication, and reporting systems. More recently, women have entered the fire, rescue, and central ammunition services, as well as

some technical specialities such as electronics.

A new project was established in 1984 to study the use of women in tank and armored infantry, field artillery, and air defense batteries, and also in air defense squadrons. Recruiting of women for these roles was begun after discussions with personnel in the units to be studied. Unfortunately, newspaper coverage of statements by an officer and counterstatements by the equal opportunities commission has heated public debate. The project group aims nonetheless at a neutral, professional study to reach recommendations that can be accepted by all parties. Currently in this study the female officers, noncoms, and privates are in training; the numbers involved are near the quotas set in most cases. The study plans to follow these groups into their operational units, with interviews and special visits to determine the human factors influencing unit performance. Interim reports are planned for 1985 and 1986 with a final project report and recommendations due in 1987.

In the Navy also, a study has been under way since 1981, when women began to be assigned to shipboard service. The experiment was completed in spring 1985 and a report is soon to be published. About 100 women were assigned to ships such as minelayers, patrol boats, and seaward defense and fishery protection ships. Females are now part of the normal picture on board. However, the numbers involved are smaller than expected, because of the difficulty of recruiting women with sufficient technical education. Attitude in the Navy toward women in service is generally positive, though variable concerning warship service. The females have performed well and shown their capability for sustained effort during long exercises and in bad weather. No negative effects on ship readiness have been discovered. No special discipline problems have arisen due to women in the crews. Discipline rates are generally higher for men; women appear to be more punctual. Illness has been only slightly higher among women.

Only five pregnancies have occurred. No differences in seasickness have been noted. Sex-related problems have occurred in the fishery protection ship which probably arise due to the lengthy period of cruises in generally bad North Atlantic weather.

Regarding physical and psychological strength, some differences have been noted. Physical strength and height differences in gunnery crews suggest that selection of women for this role needs to attend to this. But heavier burdens on men have not resulted from these differences; mixed gun crews remain sufficiently strong. Women do tend to show more nervousness in gunnery exercises, tending to close their eyes during firing, with some gunnery failures as a result. Final study of all the reports is still being conducted. But the preliminary conclusion appears to be that it is possible to use women well in Danish ships.

3 BASIC MEASUREMENT PROBLEMS

Two brief, technical presentations on fundamental aspects of measurement can only be touched on superficially here. Technical details are available from the authors.

C. Davis (US) reviewed the ONR research program on model-based measurement that underlies further development of CAT. In addition to the basic item response theory for items scored correct or incorrect, one can examine item response functions for each alternative in multiple choice items. Such functions for "good" distractors should have peaks at different points along the continuum. Bad distractors have characteristic functions that are easily recognized. Further research has been examining these phenomena, developing response pattern models and appropriateness indices with the aim of identifying rare events at the individual item and person level. Models aimed primarily at diagnosis are also being developed for use in both aptitude and achievement tests.

W. Birke (West Germany) raised a fundamental question about the nature of aptitude scales usually used for selec-

tion and classification and their tendency to reduce to a single factor. Rating scales in particular show enormous halo effects, for a variety of reasons. As the population available for military service declines in the coming years, emphasis will shift from selection to classification. Yet the measures have not been validated, and may well not be valid, for differential classification decisions. They are not that effective as linear predictors even in the general selection use either.

One reason for halo, for limits on predictive validity, and for lack of differential validity for classification, has not been much considered but may be critically important. It is suggested that aptitude scales should not range from negative to positive but from negative to negative. Dimensions such as "flexibility" or "rigidity" need to be conceived in nonlinear ways; one can display too much as well as too little of such personality traits. Also, the middle range or average person, who may be best suited for certain job requirements, is not positively describable in our typical measurement system. Our language does not provide terms to describe average persons in detailed ways; it only allows description of deviations. Moderate deviations in one direction or another may be desirable in some situations and not others. These deviations are not detectable in scales aimed at the extremes. But fitting persons to jobs requires positive accuracy and detail in these middle ranges; both extremes are negative for many job situations. To measure a trait and to evaluate a score in relation to job requirements are two very different things. But raters confuse the two and thus tend, for example, to give high flexibility ratings to an officer who is otherwise regarded as generally good.

Current research is attempting to build full-range scales using verbal anchors that are balanced in terms of social desirability around the midpoint and graded toward the negative or both ends. It is hoped that raters can use

such scales with greater differentiation. Analysis, of course, will not be based on traditional linear regression systems.

4 PERSONAL AND SOCIAL ASPECTS OF MILITARY TRAINING AND PERFORMANCE

J.E. Magro Morales (Spain) reported a pilot study to evaluate the effectiveness of training in public speaking for military personnel. The study is part of a wider social skills training program aimed at skills in interpersonal relationships and work in groups, and had as its goal also the validation of a military public speaking rating scale. The training consisted of acquiring efficient expressive behavior through behavioral assay and feedback, also using written material on communication organization and expression, analysis of speech and speech preparation, nonverbal accompaniments, and use of feedback from the audience. The methods derive from other research on social skills training outside the military. Public speaking practice and video tape review was included.

A random selection of cadets received the training; others served as audience and raters. Experimental subjects gave a pre- and post-training speech to the group and were followed up 1 month later. Test speeches were videotaped and rated using a 14-item scale covering volume of voice, pitch, clarity, pace, speech disturbances, facial expression, gaze, posture, gestures and nonverbal accompaniments, generality, formality, and variety of speech.

The data suggest some training effectiveness but also point to aspects that need expansion in the training program. Interrater agreement on the rating scale was found insufficient and may indicate that more intensive rater training is needed. More detailed analyses of the item data and revision of the training program are now proceeding.

Stracca (Italy) has studied two generations of applicants to the Naval Academy--one group from the early 1960s and one from the early 1980s--in order

to compare attitudes, expectations, personal identity, and average personality profiles across generations, and also to determine the sensitivity of selection measures to socio-environmental influences in these periods. The groups were comparable in age and education.

The 1960s group finished high school in an economic boom period. They tended to be described as not very ambitious, oriented to family, conformist and acquiescent in attitudes. The image of the military in that period reflected indifference; social welfare and technological development were the interests. Applications to the Naval Academy declined steadily through the 1960s, reaching a low in 1970 that was half, in numbers, of what it had been in 1965. In 1968 and 1977 came the student protest movements in universities and high schools, respectively. Teenagers developed more than ever before a sense of their own identity, but it was expressed fundamentally as a peer group identity. Meanwhile, economic changes had made jobs increasingly scarce. Applications to the Academy have subsequently increased from 1976 to a level in 1984 that is almost twice what it was in 1965. Petty Officer Schools have also experienced marked increases in applications. Although these changes can be attributed to economic factors and to increases in the number of students graduating from mass public schooling in part, it is also clear that the image of the military has improved. The role of the military in helping during many earthquake disasters and in the peace mission in Lebanon has contributed to this change. A military career is not now a last-resort job. Neither the 1960s group nor the 1980s group displays the extreme attitudes of radicalism, pacifism, and intolerance to authority that characterized the 1970s. The two groups seem to resemble one another in some aspects of life style and attitudes.

A selection of variables from the test and interview files of both groups were studied. Though the groups were quite similar in relation to family and in childhood perceptions, they differed

markedly in areas of interpersonal behavior, interests, travels and sexuality. There is clearly no prevailing "type" of personality in the sector of the juvenile population that applies for a military career. Rather the relevant characteristics change according to the situation of the youth of each generation.

Relative to the 1960s group, the 1980s group appeared more open-minded, uninhibited, emotionally self-controlled, confident, and communicative to new acquaintances. They displayed more interest in reading, sports, and travel, more positive attitudes toward women, and toward natural sexuality, but less trust or prospect for the future or sense of control over it. The 1960s group showed much more extrapunitive aggressiveness and ego defense in reaction to frustration; the profiles suggest sensitive, insecure, diffidence in interpersonal behavior. The 1980s group, in contrast, shows more intrapunitive aggressiveness and need persistence, suggesting more unconstrained responsive, tolerant, and active interpersonal behavior. The 1980s group also showed less social introversion but some immaturity, better balance and sociability, greater confidence and sense of well-being, more tolerance, flexibility, and open-mindedness, and a strong need for achievement and efficiency.

J. Correia Jesuino (Portugal) discussed his research on organizational socialization in the Portuguese Naval Academy. According to general socialization theory, there are two poles toward which newcomers in any organization can gravitate--a custodial stance in which the status quo is accepted without question, and a role innovation stance in which redefinition of the entire role is attempted. There is a middle-ground, content innovation stance also, in which substantive improvements in the knowledge base or strategic practices of the given role are sought. Different processes or tactics of organizational socialization are hypothesized to produce different orientations in newcomers regardless of their own personal charac-

teristics. The tactics used at the Naval Academy are such that a custodial orientation would appear the most likely result, because recruits are given a common set of experiences collectively as a group that is formally segregated from regular organizational members the sequence of steps leading to the target role is specified, experienced cadets serve as role models for recruits, and the total institutional character denies personal characteristics to the recruits. On the other hand, certain tactics--such as the time predictability of the passage through the institution and its collective nature--could prompt some kinds of content innovative orientations, according to theory.

In this context, the present research sought to test these and related hypotheses using two socialization indicators, the Rokeach Value Survey and the SYMLOG value statement rating form. The latter was described in research reported last year. Several studies have been conducted and more are planned. Data have been obtained from samples of naval officers and university students as well as applicants to the Naval Academy; accepted applicants were tested again near the end of their first year in the academy and a group of senior Naval Academy cadets were also tested. Comparisons have also been obtained from samples of Army and Air Force cadets, and from Naval Academy officers.

The detailed results show many interesting contrasts that sharpen our understanding of the socialization process in the academy. Clearly, the value systems built during the academy years become close to the institutional values expressed by the officer gatekeepers. There are no differences between accepted and rejected applicants. After 10 months or so, accepted cadets show the development of some extreme views that reinforce the stereotype of traditional military values of antipacifism and political conservatism. But this is temporary. Officers are seen not to differ from university people in valuing world peace and equality, for example. On the other hand, major differences between

military and university people can be seen to grow, with the military giving increasing importance to courage, capability, logic, self-control and obedience rather than to intellectual independence and helpfulness. The senior cadets represent their own academy strongly and seem to play a mediating role between the conventionally polarized military and civilian cultures. They come close to the ideal expressed by the socializing agents, though this ideal represents values of sociability, responsibility, friendship and teamwork as against individualism, authoritarianism, and passivity. The portrait is not at all like the military stereotype of toughness and rigidity. There are also strong symptoms of group differentiation. Evidence supports the hypothesis that the Navy culture promotes more of a mediating, content innovative orientation, not a strictly custodial role. This preliminary work is of course only cross-sectional and limited to a few measures and comparisons. Data analysis is continuing and further work is being planned.

Shavit (Israel) described the critical importance of military exercises in training and maintaining the readiness of the Israeli Defense Force, but noted that participants in the important summary and evaluation phase of such exercises consider it to be mundane, ineffective, and repetitious, with overemphasis of technical detail and lack of clear differentiation at different army unit levels. The personal and social roles to be played by different participants needed changing. The psychology branch was thus asked to develop a new method for this purpose. It was clear that a new conceptualization of such exercises and the objectives of their summary phase was needed, not just some technical methodological changes.

Any military exercise has two objectives: the drill-training itself, as an expression of the actual status of knowledge and performance; and study of the exercise to locate objectives for future training. Most time is typically spent on the first objective. The psy-

chologists' intervention was designed to improve the balance between the objectives and to focus particularly on identifying needed future improvements.

One step was to create a different kind of social interaction between the directing staff, the trainees, and the umpires, so that improved communication and expectations were shared, especially between trainees and umpires. The umpire role was changed from the traditional passive observer to an active participant observer who provides feedback and guidance during the exercise, and influences future objective selection in the summary phase. Umpires are also now carefully selected for their expertise with respect to the particular exercise conducted, the evaluation dimensions used relate directly to the exercise objectives, and umpires develop their own tools, checklists, and behavioral objectives in relation to these dimensions. Involving the umpires in this new way helps assure that they will perform the more active roles assigned them.

Another step was to develop a follow-up mechanism using the unit psychological personnel as the only permanent element across exercises. The psychological intervention collected data on the outline and objectives of the exercise ahead of time and prepared the umpires in special workshops, along with directing staffs and trainee representatives. Also, umpires and trainees were observed during the exercise by psychologists who also participated in the summary discussions. The effect was to improve both the functioning of umpires in exercises and the psychologists' ability to give commanders feedback on styles of command, communication, and decision making under regular conditions, since the psychologists are regular consultants to commanders anyway.

The test exercise was regarded as highly successful. The aim now is to implement the new procedure in all future exercises.

Sheppes (Israel) described a new program for training high-ranked officers in behavioral science related to management. An experimental project was

begun in 1984. Its great initial success has led to the planning of a 3-year modular program that would operate on a permanent basis.

Until this program, all behavioral science training was aimed at low-ranked officers and NCOs and their performance in dealing with their command situations. But it was readily observed that in the higher ranks, otherwise highly skilled officers consistently lacked knowledge of aspects of management that were essential for their success, such as understanding organizational procedures, exploiting human resources, and the process of decision making. Unlike the civilian sector, in which high-level training of managerial aptitudes is common, there had been no such training in the military despite the fact that the success of a unit often depends on such aptitudes of the commander.

This first attempt was carefully designed for colonels and lieutenant colonels, with the clear recognition that it would be closely scrutinized; any failure would end the project quickly. The list of topics were those judged most relevant, with the widest common denominator. The method chosen was a workshop format with 15 participants together in an informal secluded environment. The subject matter combined theoretical study and familiar practical material and experience gathered from participants beforehand. The coordinator was chosen to be a previous acquaintance of the participants. Participation was voluntary. Topics chosen were staff management, conducting debates, stress and burnout, managing organizational conflicts, and faulty management.

Evaluations based on participant comments, the interest of others in participation, and on formal questionnaires all indicate the strongly positive reaction to the training. The further program will also bring the unit psychologists into the picture so that follow-up in the operational units of the participants can both extend the program effects and contribute to evaluation of it. It is thus hoped that eventually training effects can be seen in the man-

agerial performance of these leaders, not just in their comments.

Two aspects of the measurement problems of concern in the personal-social realm were addressed by papers from Norway and France. The first concerned the measurement of leadership styles among managers. The second dealt with the data systems needed to track personal-social pathologies in the military organization as a whole.

Fløistad (Norway) demonstrated the instruments used in relation to the Hersey-Blanchard theory of situational leadership. In brief, the theory posits that there is no single all-purpose leadership style that can be judged as best. Rather, successful leaders adapt or shift their styles to meet the demands of the situations they face. Two key dimensions are the amount of direction, or task behavior, and the amount of socio-emotional support, or relationship behavior, that a leader must provide given the situation and, particularly, given the level of maturity reflected in the follower group. The basic instrument, called the Leader Effectiveness and Adaptability Description, contains twelve situations with alternative actions in multiple choice format. Responses can be self-scored to yield weights in each of the four quadrants of the task behavior x relationship behavior matrix. The leadership styles represented by the four quadrants are termed "delegating" (low, low), "participating" (low task, high relationship), "selling" (high, high), and "telling" (high task, low relationship). A leader may have relatively high weight in one or more of the quadrants. The important point, however, is that four different levels of maturity among the subordinates map onto the quadrants to suggest which of the four styles is most likely to succeed with which level of group maturity. The maturity measure is a self-rating completed by each member of the group. Respondents select job objectives and rate themselves on 10 dimensions of performance reflecting aspects of knowledge and ability but also willingness, responsibility, achievement

motivation, persistence, and independence. The mapping suggests that delegating, participating, selling, and telling leadership styles are appropriate for groups with high, high-moderate, low-moderate, and low levels of maturity, respectively.

The paper by Barrois, Bazot, Assedo, and Boulard (France) described the various automated clinical data systems used by the psychiatric service of the French armies. First, there is a data collection and epidemiological system. It indicates the incidence of the whole general pathology, using the World Health Organization's codification. Complete annual statistics are reported. At the selection level, data from the 400,000 persons examined each year give a general personal and social health evaluation picture of the 18-year-old male civilian population. At the level of discharge for unfitness, a special picture is provided; half of the 20,000 cases per year are for psychiatric reasons. Also, a regularized information sheet on drug addiction permits follow up study of addiction evolution in 18 to 26 year olds. Two other systems are the automated psychiatric documentation system, a basic instrument for the study of psychiatric hospital epidemiology, and the automated psychiatric clinical observation, which contains individual clinical data for use in research aimed at military objectives and in management and clinical teaching in psychiatry.

5 COPING WITH STRESS, PANIC, AND COLLECTIVE BEHAVIOR

L. Crocq (France) gave a substantial review of panic and other inadapative collective behavior related to expected aspects of modern combat. Examples of both adaptive and inadapative behavior were vividly illustrated with anecdotal evidence and photo and video records from past wars but also from recent natural disasters and public panics. The aim of such study is to foresee the major psychological characteristics of modern warfare, its potential effects on individual and group performance, and

the types of variables that might act to increase adaptive and reduce maladaptive responses among military and civilian personnel.

First, the characteristics of modern war would likely be suddenness, with rapid and physically intense first combat, then sustained combat over several days and nights without relief, including the use or threatened use of nuclear, biological, and chemical weapons. Second, the consequences for the psychology of the individual combatants would likely be: intense feelings of human vulnerability in the face of modern weapons; psychological shock of widespread material and human destruction and profound sights of death and injury; combat fatigue and intense stress from physical shocks, vibrations, noise of weapons and explosions; fatigue and stress due to sleep, food, and drink deprivation; long periods of anxious waiting in cramped shelters; protracted wearing of protective gear and consequent loss of freedom of movement and interpersonal communication; terror of nonconventional weapons feared in mythical or irrational ways, including fear of either instant or extremely protracted death; and fear of helplessness due to physical and mental debilitation caused by these weapons. The result would be expected to be marked increase in combat exhaustion and in the proportion of severe cases, in immediate emotional reactions also with larger proportions of severe cases, in precombat debilitating anxiety, avoidance, and malingering behavior, and in collective psychopathology including rumor, panic, and disorganization.

Collective behavior in such circumstances can be analyzed only at a group level, though it is the sum of individual actions linked to the same event. It is manifested in a collective mentality that differs from the isolated pathology exhibited by individuals. It may be judged as adjusted or maladjusted and can involve rescuers and the neighboring population as well as victims and survivors. To examine it, we can look to evidence from disasters in history; on-site

observations by behavioral scientists in modern disasters, or film records from them; inquiries of survivors; opinion polls and journalist descriptions; simulated disasters including computer simulations; and experiments with social animals.

Tables 1 and 2 compile some characteristics of group behavior in catastrophes, as best can be judged from present evidence. Table 1 divides the phenomena spatially into four zones of proximity to the center of the catastrophe. Table 2 divides into six temporal phases and notes both adjusted and maladjusted behavior. In general, adjusted group behavior is characterized by conservation of group structure, hierarchical organization, and functioning through division of tasks and mutual help. Individual components include obedience to orders, execution of trained skills, orderly maintenance or evacuation of posts. In contrast, maladjusted behavior (from individual to group) will involve lack of lucid appraisal of the situation;

disobedience to orders; often a concussion-inhibition-stupor reaction; agitated and usually repetitive, useless, senseless activity; regression to gregarious and collective consciousness; loss of group cohesion and hierarchy; and often extreme panic and flight. The stupor reaction at the group level can lead to loss of all initiative, mass surrenders, and mass suicides.

Finally, it is useful to draw some lessons from all the accumulated evidence from past catastrophes, relating particularly to the use or threatened use of nonconventional weapons. First, all civilians should have objective information about conventional, atomic, biological, and chemical dangers and about protection and existing therapeutics. Second, military selection should be carefully aimed at detecting potential mental illness, psychic fragility, and those particularly subject to mental contagion. Third, military instruction and training should be carefully designed to reinforce objective knowledge of

Table 1
Behavior According to the Zone of the Catastrophe

ZONES	PARAMETERS			BEHAVIOR
	Material Destructions	Casualties	Social Disorganization	
zone of impact	total	dead wounded shell-shock survivors	complete	commotion-inhibition-stupor prostration local panics agitation
zone of destruction	important	wounded concussions disaster struck psychic trauma	very disturbed	disarray agitation panic centrifugal flight
marginal zone	partial (communications)	emotional shock	mild (disconnected from the center)	indecisiveness rumors possible panic
external zone	no destruction	no casualties	organization maintained	centripetal movement sympathy reparation help

Table 2

Behavior According to the Phases of the Catastrophe

PHASE	PARAMETERS			BEHAVIOR
	Duration	Psychology	Social Order	Adjusted (A) Maladjusted (M)
Preliminary	Varied according to situation: weeks, months,	Information	Exercises	Preparativeness (A)
		Anxiety Carelessness	No order	Rumors (M) Derivation (M)
Alert	Brief: one hour or more	Vigilance	Increased cohesion	Prepare to action (A)
		Fear Carelessness	Individualism	Anxious restlessness (M) Refusal to alert (M)
Shock	Very brief: a few minutes	Useful stress	Soc. order Chief present	Focused attention (A) Prepare to action (A)
		Surprise Fright Vulnerability fr. Centrality illus.	Group destroyed Chief absent	Sideration (M) Automatic behavior (M) Fetch outside help (M) Ready to imitate (M)
Reaction	Average: one to several hours	Awareness Desire to save	Soc. order Chief present	Obey to order (A) Mutual help (A) Spontaneous leader (A)
		Regression Suggestibility Gregariousness	Group destroyed Crowd Chief absent	Inhibition-stupor (M) Centrifugal flight (M) Agitation (M) Panic (M) Exodus (M)
Resolution	Average: a few hours	Clear consciousness	Group reformed Reorganization Chief present	Agitation stopped (A) Panic stopped (A) Inhibition finished (A)
		Emotive shock		Inhibition persist (M)
Complication	Long: several days several weeks several years	Desire to live	Reorganization	Mourning (A) Reconstruction (A)
		Trauma remembrance Emotive sequels Regression infant.	Lack of authority Tutelage	Violence (M) Hooliganism (M) Scapegoats (M) Dependency (M) Demands (M)

the dangers and remedies and the nature of modern warfare, including nuclear-biological-chemical weapons; to habituate the use of protective equipment and skills; and to make adaptive adjustive behavior as automatic as possible. Fourth, exercises in improvisation, officer substitution, and panic reduction should be included in training. Fifth, officers should have plans for placing a sanitary cordon around the periphery of any catastrophe. Its purpose would be to filter both the centrifugal exodus to neutralize spread of mental contagion and the centripetal movement to aid organization and screen out useless or negative intrusions. Personnel serving in such a cordon also provide information about the catastrophe and the location of aid stations. The aim is to reimpose calm, order, and discipline. Improvised aid and medical posts have important psychological as well as technical effects in avoiding panics.

The papers below take up aspects of the problems identified by Crocq. One deals with cognitive appraisal in stressful situations. A second concerns the effects of sustained operations. A third reports recent experience with collective behavior in violent demonstrations. It also reports on interventions in stressful situations following fighter pilot accidents. And a fifth addresses the problem of suicide and group morale.

B. Shalit (Sweden) summarized his recent research on a sequential appraisal model for assessment of military effectiveness and coping with stress. The model is based on the view that a series of stages in the perceptual process builds up a mental picture of a situation which is essential for coping reactions particularly under stress. The process is regarded as a Markov chain in which each stage sets limits on the effectiveness of the following stage. The nine stages in the model, categorized according to process modality and phase, and stated in the form of questions, are shown in Figure 1.

An open-ended questionnaire instrument called the "Wheel" has proven successful in assessing the appraisal phase, i.e., first three stages. Respondents identify factors they think characteristic of a defined situation, rank them in importance, judge them as positive or negative, and indicate the degree of control that can be exercised over them. A series of scoring formulas then indexes the cognitive structure (degree of differentiation) of the situation, motivation (degree of emotional investment, positive or negative), emotional balance (positive versus negative emotional involvement), and coping (degree or felt control over factors), in the situation. One can also score the content of particular responses, using content analysis schemes.

Process Modality	Process Phase		
	Appraisal	Mobilization	Realization
Structure: Cognitive	¹ IS it?	⁴ Do I UNDERSTAND?	⁷ HOW shall I do?
Motivation: Affective	² Does it CONCERN me?	⁵ Do I WANT?	⁸ Shall I COMMIT myself?
Movement: Instrumental	³ Can I AFFECT it?	⁶ Am I READY?	⁹ DO!

Figure 1. Sequential adjustment model.

Research evidence from several studies was then reported. A study of parachute jumping supports the hypothesis that any break in the sequence will lead to failure; adequate processing at each stage is necessary but not sufficient to ensure success. A study of squad effectiveness suggests that such criteria as squad member evaluation, NCO evaluation, and sick absenteeism can be predicted with the appraisal indices. Notably, variances in a group on the appraisal scores, not just means, are important indicators. Finally, a study of different groups' appraisal during the recent submarine threat in Sweden indicated that differing amounts of military training and experience related closely to differences in the appraisal indices. Rangers showed the most effective appraisal and coping, civilians the least, with experienced and new soldiers ranged between. The approach continues to show itself empirically to be a useful assessment of appraisal processes and their relation to performance effectiveness in stressful situations.

Stivalet (France) contributed a discussion of the psychological and ergonomic factors of special concern in the sustained operations likely in a modern war. Modern technology and equipment no longer impose the limits that dictated the traditional military strategy of high activity by day, with delaying action and low activity by night. The only restricting factors to sustained operation now are human. There are thus at least three immediate concerns for research. First, sustained operation ruptures the circadian rhythm. Second, the loss of sleep interferes with the mental and decisional abilities of information processing personnel. Third, the rapidity, violence, and uncertainty likely in modern war greatly increases stress. There is no clear recommendation on tolerable fatigue thresholds for decision makers.

Consequently, a study was planned to accompany the divisional headquarters units in three military exercises involving sustained operations. Observations based on a structured activities card

and questionnaires were used to assess both types of activities and level of work in them over 24-hour periods. Questionnaires dealt with types of fatigue, mood state, dynamism, and sociability. Informal interviews were also used.

Results suggested strong relation of sleep patterns to mobility pattern of the divisional HQ, with resulting global increase in fatigue according to the intensity of deprivation of sleep. In an armored division HQ that moved each 8 hours, staff obtained a daily average of $2\frac{1}{2}$ hours of sleep, compared to 6 hours of sleep in an infantry division HQ that remained immobile throughout the exercise. Another armored division HQ spent the first 30 hours at one site, then moved every 6 hours thereafter; here the sleep averages were 5 hours in the first period and 2 hours thereafter. Comparisons among the units suggest that fatigue accumulation follows deprivation of sleep and not a circadian effect. Accompanying the fatigue there was also significant diminution of dynamism, but no effects for anxiety, mood, or sociability. These first studies suggest that the methodology works well and is not intrusive. Recommendations for the present include the use of shifts to allow more adequate sleep in mobile units, a supply of thermal-controlled and sound-proofed trucks to optimize sleep quality, and an informational program to show commanders the effects of sleep loss and to counter the prevailing myth among officers that need for sleep is a discredit to the individual.

Wassenberg (The Netherlands) reported on two new tasks now faced by Dutch military psychologists: providing assistance in dealing with violent public demonstrations and in air accident investigation and prevention.

The psychology of violent demonstrations is a new topic for behavioral scientists generally, and it was imposed suddenly on the Dutch group by the decision to designate a particular airbase as the site for cruise missile deployment. This decision brought large numbers of demonstrators to a base that had a guard unit originally composed of only

30 NCOs and conscripts. In the demonstrator group, there are four types of persons: ethically motivated demonstrators making their protest public; hard core, antimilitary activists who are willing to use or advocate violence; riot-happy persons who participate regardless of the cause; and curious on-lookers. Their activities include general protests against the government, attempts to talk with guards about their work, verbal harassment of guards, throwing projectiles, starting fights, and attempting to damage fences, penetrate the base, destroy property, and occupy buildings. The guard unit, now expanded to 200, including officers and many NCOs, initially experienced communication and adjustment problems that contributed to the unpleasant situation created by the confrontation. The problems faced by guards are as follows: career personnel feel socially isolated, held in contempt for doing their jobs; harassment, the projectiles, and the property damage, lead personnel to feel aggression toward demonstrators; neither guards nor leaders have been trained to deal with violent demonstrations; there is considerable uncertainty regarding permissible forms of counter-violence; the pressure produces strong internal cohesion, strong outwardly directed aggressiveness, and incidental destructive acts in letting off steam. Aggressive reactions by guards to provocations are photographed by demonstrators to obtain legal evidence and to further demoralize guard personnel; this further aggravates stress and uncertainty.

So far, the behavioral scientists have identified the training and facilities needed for the general well-being of the guard personnel, devised and implemented training programs aimed at controlling stress and establishing and maintaining discipline and leadership, and further defined the duties of the behavioral scientists in this sphere. It is clear that further training of guards, resembling that given to police in combat exercises and use of firearms, will be needed; there is substantial public resistance to guards performing

tasks normally reserved for police, however. The role of the behavioral scientists at the demonstration site also includes advising the commander on deployment and general well-being of personnel, briefing and debriefing, suggestion of ways to work off steam, to use leisure and recreation, and to improve morale. As the November decision date on cruise missiles in The Netherlands approaches, violent demonstrations are expected to increase. The effectiveness of training and the other preparations will be tested.

Regarding air accidents, psychologists normally participate in boards of inquiry, as before, but now also have an enlarged and new set of tasks as a result of extensive debates on how best to use psychologists in this sphere. The following principles and practices have been developed as a result. Specialized knowledge of human factors in air safety and accidents is built up through courses and specialized reading not ordinarily available in university psychology programs. A psychologist is assigned to develop close confidential relationships with the members of each squadron, through frequent visits, to obtain understanding of the psychosocial conditions of the squadron and whatever preconditions may relate to accidents. Though it is difficult to overcome initial distrust, over time the psychologists have been accepted and in a number of cases have probably helped to avert accidents by identifying psychosocial problems ahead of time. Squadron leaders now regularly ask advice on a variety of issues related to the stresses and strains on pilots. The time elapsing between an accident and the psychologist's interview is now minimized, so that susceptibility of the accident memory and cognitive appraisal of it to naturally occurring distortions of fact can be minimized. Psychological first aid both to accident victims and to survivors, other pilots, and family members can also be administered with minimum lapse of time after an accident. The investigative aim is to study human errors in accidents and the conditions

that cause mistakes, with the objective of prevention in the future. The study of stress factors, in particular, is a focus since inadequate stress coping has been linked with pilot mishaps. In most of these tasks there is close cooperation between flight psychologists and flight surgeons. There is also an important general counseling objective met by free availability of a trusted psychologist in each squadron. And each is also prepared to give short briefings on all kinds of psychological subjects to the pilots, including information on relaxation techniques and other stress coping methods.

In the experience developed so far, two related general impressions deserve note, in addition to the above details. One is that considerations of air safety alone might dictate the exclusion of certain adventurous personality types from fighter pilot training and service who are actually the best persons to select for wartime performance. But if these somewhat more accident-prone individuals are indeed selected, especially careful attention has to be paid to the human factors involved in their performance in particular kinds of aircraft. There is the strong impression that the design of the F-16 has failed to consider certain human information processing functions that are critical, and perhaps most critical for these pilots. Automation of functions that previously were carried out by the pilot may cause them to be ignored as variables in the cognitive system of the pilot. The result may be a false sense of control, especially in some pilots. This sort of person-situation interaction deserves much more research attention than it has received to date. Given the observation that technical factors contribute about 30 percent to air mishaps whereas human factors contribute about 70 percent, the disproportionate investment of research on technical factors relative to human factors is seriously ill-advised; much more investment in human factors research is needed, especially with today's advanced aircraft and the stresses involved in piloting them.

Aydin (Turkey) discussed suicide and attempted suicide as a problem in and of itself, but also as an indicator of morale in army groups, and its possible contagious nature. Such behavior can result from problems in a group, but also can seriously affect the group; increases in incidence can identify problems in a group. The methodology for conducting retrospective investigations of suicide attempts has been developed since 1979 using questionnaires, now accompanied also by formal reports from commanders, physicians and psychiatrists, and witnesses, and interviews with family members. The approach is thought of as a kind of psychological and social autopsy of the suicidal behavior. The questionnaire has been improved and accepted; it also has had the effect of increasing the sensitivity of commanders to the problem and its prevention. More attention to unusual behavior, more relief from special duties, and more referrals to army psychiatrists have occurred.

It appears that personal factors, rather than environmental or other factors, underlie more than half the suicide attempts. Most suicides are by gunshot. Drug overdose has declined significantly as a method since 1980, when warnings were issued against prescriptions for long periods or without medical supervision. The methodology has produced several other suggestions for preventive measures. Group identification, supportive and friendly relationships, and the knowledge that one's performance is appreciated are factors in army life that could work against the personal factors underlying suicidal behavior. The stresses of army life do not appear alone to be major factors.

6 RECRUITMENT AND RETENTION

K. Wenek (Canada) described how, with Canada's all-volunteer force and changing economic conditions, the average educational level of recruits has been going up steadily from 1975 to the early 1980s. The selection ratio has changed from 1/8 to 1/3 over these

years, however, and the general classification test scores as opposed to educational attainment have not changed significantly in either the English-speaking or the French-speaking recruit population. There is also a continuing training demand. The trainability problems show up in advanced technician training programs 4 years after initial recruit entry, and the result is high voluntary attrition. The implication for policy is that it is clearly time to try new programs to combat this. Among the initiatives being considered are: removal of age barriers for recruits; more use of women; provision for lateral entry; more use of a reserve status rather than complete withdrawal; better connection of the training system with the civilian educational system; improvement in the incentives for national public service; and better development of military socialization.

Van Breukelen (The Netherlands) has been investigating motives for joining and leaving the Navy and the degree to which these motives are similar. Using surveys and interviews in a continuous measuring system, job satisfaction and plans to leave are assessed at several critical stages of sailors' and officers' careers. The instruments cover career planning, work content and context, personnel policies, job benefits, and organizational structures of the Navy, as well as personal problems and external factors such as national politics and economics.

Voluntary turnover can be seen to result from individual, work-related, and opportunity factors. There is clearly a self-selection process. Those who are dissatisfied leave quickly, while turnover decreases with length of service; the satisfied stay, and chances for other jobs decrease with age. It is also clear that the labor market situation has decisive influence, but differs greatly in different sectors, and is as much a function of individual perceptions of job changes as it is of objective conditions. Based upon the most recent results, officers appear to join the Navy because of the attraction of

sailing, expected variation in work functions, the combination of practical work and useful training, the status and organization of the Navy, and its pay and other benefits. But they also leave for reasons attached to these same factors: impossibility to realize individual interests, lack of inspiring work, absence from home, and low pay and benefits relative to opportunities in another job. Enlisted men and petty officers also join for the attraction of sailing and to be independent, but leave because of the absence from home due to the sea-to-shore ratio, and for developing marriage plans. It is seen as a steady useful job with variation in work and technological development. But leavers see the pay and benefits, work content and atmosphere as relatively unattractive.

It appears that attitudes toward a Navy career have changed. Where once a Navy career was considered a way of life, it is now just another job to be compared with other jobs. Motivation and satisfaction are dynamic processes related to the continuous comparison of ones' present situation and the perceived alternatives. This of course changes over time within the society and within the person at different ages. It is clear that the continuous measurement system is needed to track these dynamics if fluctuations in turnover are to be understood and anticipated.

Dennison (UK) described the similar measurement system used by the British Army, called the Continuous Attitude Survey for enlisted men; there is also a parallel Officers' Attitude Survey. Such an instrument allows the monitoring of general trends, at least at a coarse level, that can be useful for policy making. On the other hand, it offers only limited prediction of premature voluntary retirements, which must be understood on an individual, specific concerns level. There are some additions to such instruments that could be helpful.

The continuous survey system has operated since the late 1970s to replace the one-shot studies used previously.

The instruments consist of about 25 multiple choice questions; responses are anonymous. For enlisted ranks, the trend data available from 1976 show the worsening of soldiers' attitudes in the late 1970s and their improvement in the 1980s; the curves for the Army's meeting of pre-enlistment expectations, Army versus civilian career prospects, satisfaction with Army life and pay, are similar; so also is the curve for a question about plans to extend service that was added in 1978. For officers, it was found in 1979 that only 8 percent of respondents definitely intended to leave the service; by 1984, 9 percent had left. Those planning an Army career indicated job satisfaction the best feature and house purchase the feature most needing improvement. Those not planning a career indicated job satisfaction as both the best feature and also the one most needing improvement. Thus, an Army officer career may have a high potential for job satisfaction but, if this is not realized, that fact is clearly perceived.

The research to date indicates that additional topic areas should be added to the surveys, even though it is difficult to add questions dealing with specifically defined irritants. The suggested additions fall into five categories: factors affecting family and personal life; promotion prospects and system; shortages of manpower and equipment; administration; and present and future job satisfaction. Specific irritants have been defined in each. To aid in diagnosing these specific personal factors, the instruments will also need to include open-ended questions in addition to multiple-choice items. It is also recommended that policy changes aimed at alleviating discovered sources of irritation be studied using comparisons of individual differences among stayers and leavers, so that conclusions about the latter can be clarified.

7 SPECIAL RESEARCH TOPICS FOR THE FUTURE

R. Penn (US) presented a paper by J. Tweeddale (US) reviewing future needs

for military research and development in the behavioral sciences. Given that we face a future of tightly constrained resources, within which long-term behavioral science research and development will continue to have relatively low priority, it is critical that we identify the top priorities for research and find ways of integrating heretofore separate efforts in areas such as manpower, personnel, training, human factors, and organizational research. Better communication and cooperative planning among the agencies represented at IAMPS would help in this connection.

One set of priorities derives from the fact that governments will not allow public sector managers to speculate with taxpayer capital, so archaic industrial plants often hold the exclusive right to perform critical functions. Within this context, we badly need valid measures of productivity for individuals and groups, along with studies of workload allocation, job design, and optimum incentives. One question is what organizational practices allow public sector organizations to perform well. Another is how to use individual differences to match person and jobs to greatest economic and strategic advantage. In this work, the job system should be seen as dynamic, not fixed. The challenge is to develop job systems that not only adapt to the characteristics of the job holder but also exploit the potential of individuals to render their unique and maximum contribution to system performance. Few data are available that relate job performance to individual differences in detailed and useful ways.

Another set of priorities derives from the increased role of automated and complex technological systems, which move the human contribution to work away from sensory and motor performance toward complex perceptual and cognitive performance in decision making and problem solving. The research priorities here include understanding and improving how decision makers evaluate trade-offs, judge importance of different objectives, and separate judgments of fact from judgments of value. Multiperson

decisions, elicitation of expert knowledge, and individual differences in decision making are also important research topics. How do we understand the operator's cognitive model of a given task at a given time? How can systems be designed to use and match this model? How do we best combine the algorithmic capabilities of computers and the heuristic capabilities of persons? For computers to be made optimal amplifiers of human cognition, we need a much improved theoretical model of human cognition.

* * *

The concluding discussion of the IAMPS meeting moved to consideration of suggestions for future symposium content and format. It was agreed that the individual paper presentation format needs to be maintained, at least for a good part of the meeting, but that some small group division on special topics and

time off for informal discussion would be beneficial and possible if meeting and living quarters could be arranged in the same physical location. Special topics would of course need special preparatory work. Suggestions of topics for either general or special consideration in the future were: criteria of performance effectiveness; morale and stress coping; the psychology of courage; closer examination of the actual models and tools used as measures in various areas; officer selection and training philosophies and socialization; the actual conduct of applied, field, and clinical psychology; training technology; organizational development; and terrorism. A new format suggestion was to ask that the host country invite one of its outstanding psychologists to deliver a speech on exciting new research and development in some area of psychology, basic or applied.

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